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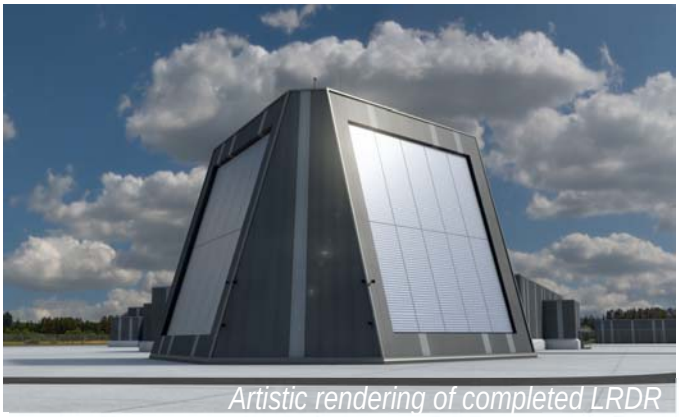
Fact Sheet

Long Range Discrimination Radar (LRDR), Clear Air Force Station (AFS), Alaska


Artistic rendering of completed LRDR

LRDR is designed to provide the warfighter advanced sensor capabilities supporting the range of requirements from missile warning, through tracking and discrimination, to space domain awareness. Once operational, LRDR will provide an unparalleled ability to simultaneously search, track and discriminate multiple small, baseball-sized objects, including all classes of ballistic and hypersonic missiles, at very long ranges, 24/7/365. LRDR combines proven solid-state radar technologies with proven ballistic missile defense algorithms, all based upon an open architecture platform capable of meeting future growth. What sets LRDR apart is a unique polarization approach to accurately identify threats in a dense operating space, massive arrays measuring a combined 60 feet high and 60 feet wide, and gallium nitride technology for a more powerful, more capable radar. This technology was designed to be:

- Adaptable for Future Threats: The radar can be scaled and extended to adapt to new threat sets, like hypersonic threats, without changing the hardware design
- Efficient and Reliable: Scalable and modular gallium nitride based “subarray” radar building blocks provide advanced performance and increased efficiency and reliability.
- Persistent Track and Discrimination: Its unique maintain-while-operate capability provides very high operational availability and enables continuous operation.
- Multi-mission capability: LRDR is a multi-mission, multi-face radar capable of conducting missile defense and space domain awareness (SDA) missions through a 220 degree wide field of view. LRDR tracks and discriminates multiple threats simultaneously, providing precision track and discrimination data to Missile Defense System (MDS) firing units such as the Ground-Based Midcourse Defense (GMD) System. For SDA, LRDR can monitor satellites orbiting the earth, detecting, tracking, and identifying active/inactive satellites, spent rocket bodies, or fragmentation debris.

Overview: LRDR is currently undergoing radar installation at Clear AFS, Alaska, and will provide persistent long-range midcourse discrimination, precision tracking and hit assessment to support the Homeland Defense Capability against missile threats to the homeland and in the Pacific theater.

- The LRDR will operate in S-band frequencies featuring a scalable, open systems architecture to mitigate evolving threats. The LRDR will be integrated into the MDS through the Command and Control, Battle Management and Communications (C2BMC) element.
- LRDR’s improved discrimination capability in the Pacific architecture will increase the defensive capacity of the homeland defense interceptor inventory by conserving the number of Ground-Based Interceptors required for threat engagement.

Maturity, Testing & Fielding: The core technology is declared Technical Readiness Level 7 by the U.S. Government – which means that LRDR has demonstrated its system prototype in an operational environment.

- This TRL assessment was primarily achieved through the integration and testing conducted at Lockheed Martin's (LM) Solid State Radar Integration site (SSRIS) in Moorestown, NJ.
    - The SSRIS is a scaled version of the final LRDR radar and uses the production hardware, tactical backend processing equipment along with tactical software that successfully demonstrated prototype system performance in an operational environment.
    - The SSRIS has performed numerous live precision satellites tracking exercises since 2018, including the Lincoln Calibration Sphere-4 (LCS-4). These type of tests are also similar to tracking ballistic missiles because it enables the radar to verify sensitivity performance, track accuracy, and calibration. Recently, during an LRDR Capability Exercise Event in December 2020, the SSRIS tracked over 200 satellites with up to five simultaneous satellite tracks over an eight hour period, highlighting LRDR's AESA technology and overall readiness.
    - LRDR SSRIS plans to track up to six rocket launches from NASA's Wallops Island flight facility throughout CY21.

- Missile Defense System (MDS) ground test activities are underway for LRDR. These MDS ground tests certify the operational capability of the MDS software. Ground test campaign consists of test cases comprised of operationally realistic raids of complex ballistic missile threats, interceptors, and space objects and use accredited modeling and simulation (M&S) to drive end-item deployed systems which are called hardware-in-the-loop (HWIL). These Test Cases exercise significantly more MDS element capability than live flight testing because raid sizing, threat complexity, launch/impact locations, and interceptor density are impossible to replicate in a live flight test.

- LRDR has demonstrated system maturity and capability by successfully supporting the GTI-08a test campaign through 10 months of Full Architecture Continuous Development Integration events. LRDR will continue to demonstrate its readiness and capability through continuous participation in additional MDS ground test campaigns.

- LRDR is on track for delivery and Initial Operational Capability in 2021, having completed all major production activities as well as array panel and equipment installation in Clear, Alaska. As part of the MDA Integrated Master Test Plan, LRDR will support live flight tests.

Solid State Radar Integration Site (SSRIS)

Rear view of LRDR, Clear AFS. The white structures are Array Assembly Areas used only for Environmental Protection during radar installation.